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# Intra-Industry Trade, Foreign Direct Investment, and the Reorientation of Eastern European Exports

To what extent does growth in exports in Central and Eastern Europe reflect economic restructuring and changes in the composition of trade as opposed to "redirection" of traditional CMEA exports to the West?

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September 1996

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## Summary findings

In the first half of the 1990s, after the demise of central planning, exports to OECD countries from many Central and Eastern European countries grew rapidly. Hoekman and Djankov explore what trade data suggest about the extent to which growth in exports reflect economic restructuring and changes in the composition of trade as opposed to "redirection" of traditional CMEA exports to the West.

They also investigate the role of vertical intra-industry exchange in the expansion of trade with Western Europe — that is, getting inputs from European Union (EU) suppliers that are then used in the production of goods exported to the EU.

They find a strong relationship between export performance and growth in vertical intra-industry trade with the EU. The Czech and Slovak Republics, Hungary, Poland, and Slovenia all rely heavily on the EU for inputs — more so than Austria, Portugal, and Spain, for example. As their per capita exports to the EU have also grown the fastest, this appears to be a characteristic of successful transition.

The Czech and Slovak Republics registered the highest growth in exports and the greatest reorientation in the pattern of trade. They have the highest level and rate of growth in intra-industry trade with the EU, but have undergone the least change in composition of exports. But substantial changes have occurred in the composition of exports *within* traditional export categories. This suggests that Czech and Slovak firms pursued a strategy of upgrading and differentiating "traditional" exports, relying on EU firms for new machinery, components, and know-how.

Simple redirection of goods that were traditionally exported to CMEA markets does not appear to have played an important role in the growth of exports to Western Europe. Export growth is in products that were not exported to the CMEA or in "traditional" export items that have been substantially upgraded or differentiated.

Inflows of foreign direct investment — limited before 1994 — correlate highly with levels of intra-industry trade. But if large investments in the automobile sector are excluded, foreign direct investment seems unlikely to have been a major force driving the growth of intra-industry trade. These exchanges and the underlying integration into the world economy (Western Europe) mostly reflect arm's-length transactions between Central and Eastern European firms and their European counterparts.

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This paper — a product of the Private Sector and Finance Team, Europe and Central Asia, and Middle East and North Africa Technical Department — is part of a larger effort in the department to monitor economic developments in Central and Eastern Europe. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Faten Hatab, room H8-087, telephone 202-473-5853, fax 202-477-8772, Internet address fhatab@worldbank.org. September 1996. (29 pages)

# Intra-Industry Trade, Foreign Direct Investment and the Reorientation of Eastern European Exports*

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Keywords: Intra-industry trade, foreign direct investment, Central and Eastern Europe, economic integration

JEL codes: F14, F15, F23

* We are very grateful to Ying Lin for his excellent research assistance in compiling and extracting the data used in this paper. Our thanks as well to Alan Deardorff, Simon Evenett, Bart Kaminski and Zhen Kun Wang for constructive suggestions. The views expressed are personal and should not be attributed to the World Bank. Address for correspondence: B. Hoekman, The World Bank 1818 H St. N.W., Washington D.C. 20433 USA. Tel 202 473 1185; S. Djankov, Dept. of Economics, University of Michigan, Ann Arbor MI 48109, USA. Tel: 313 763 9110.

## 1. Introduction

Following the demise of central planning and the associated collapse of the Council of Mutual Economic Assistance (CMEA), countries in Central and Eastern Europe and the former Soviet Union (FSU) experienced massive economic shocks. The greater the distortions in the pattern of specialization that existed under the CMEA, the greater the restructuring required at the level of the firm/industry. Clearly such restructuring takes time, and has not been completed. This paper explores what trade data suggest regarding the extent to which countries have restructured their economies to compete on world markets. The incentives confronting managers of firms in former centrally-planned economies (CPEs) vary significantly, and it is difficult to establish direct measures of existing policy regimes. Trade performance provides an objective, comparable source of information on the impact of differences in policy regimes.

It is helpful to think about the transition to a market economy as a move away from autarky towards free trade. Import competition, price liberalization, allowing entry and exit of firms, and the imposition of harder budget constraints confront producers with market disciplines. As a result, resources are used more efficiently, and firms specialize in activities and products in which they have a competitive advantage. Opening up to international trade promotes economic growth by establishing linkages with--and integration into--the world economy and by forcing governments to take complementary actions as well. Sachs and Warner (1995) have shown that countries that have done the most to integrate into the world economy have been most successful in attaining above average rates of economic growth. The literature tends to focus on measures of openness (trade to GDP ratios) to define integration; little attention is devoted to the type of trade that occurs. This paper hypothesizes that in the CEEC context vertical intra-industry trade with OECD countries (Western Europe in particular) is likely to be a major mechanism fostering integration.

The pattern of production and trade that emerges after opening the economy is driven in part by relative factor prices (endowments), and in part by economies of scale and scope. Much depends on history--the initial conditions determined by investment decisions under central planning. The first determinant will give rise to inter-industry trade: for example, the exchange of unskilled labor-intensive goods for human capital-intensive products. The more dissimilar are countries' endowments, the greater the volume of trade will be. The second factor will generate intra-industry trade: the exchange of similar manufactured products, with firms specializing in different varieties of similar goods, and relying increasingly on foreign suppliers to provide intermediate inputs and components used in their production process. The more similar are countries, the more important the

latter type of exchange becomes (Helpman and Krugman, 1985). Distance is also important in explaining intra-industry trade (Helpman, 1987).

The relative importance of intra- versus inter-industry trade for the Central and Eastern European countries (CEECs) or the FSU is difficult to predict *ex ante*. Some of the countries involved are well endowed with natural resources--minerals, oil, gas, agricultural land. Many are also relatively well endowed with human and physical capital. Real wage costs are significantly lower than in Western Europe. Such factors will result in trade patterns predicted by the standard Heckscher-Ohlin theory, with countries exporting goods and services that use (embody) relatively abundant production factors. Given that many CEECs, especially in Central Europe, are industrialized nations with a relatively diversified manufacturing base and a well-educated labor force, intra-industry trade should also be important. There are two types of intra-industry trade, horizontal (the exchange of similar goods) and vertical (the exchange of inputs for more processed outputs).

A characteristic of central planning was extensive vertical integration of production and standardization of products, both inputs and final goods. The transition to a market economy involves vertical disintegration, with firms specializing in a limited number of activities. The collapse of the CMEA meant that shifting exports to hard currency markets was crucial to many firms. A lack of knowledge of how to produce for export to OECD markets existed, however. Information on quality standards, packaging requirements, tastes (design of goods), and distribution channels was needed. Upgrading of production techniques frequently required new machinery and/or access to high quality intermediate goods from abroad. European firms were an obvious source of know-how and finance for CEEC enterprises seeking to export to Western Europe. The weaknesses in both in-house capacities and absence of independent providers of market services in the early stage of transition should stimulate intra-industry trade. Such trade is primarily *vertical* in nature, as opposed to the horizontal exchange in close substitutes.[1]

Successful export reorientation requires that managers of CEEC firms have incentives to pursue these linkages. There are two avenues through which intra-industry exchange might occur: via foreign direct investment (FDI) and via non-equity-based relationships. FDI flows into Eastern Europe after 1989 were limited, and heavily concentrated in a few sectors such as automobiles

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1/ For restructuring to occur, market institutions must exist (such as legal regimes establishing and enforcing private property rights). In most CEECs these were in place relatively rapidly (World Bank, 1996). While state-owned firms remained dominant in many countries in the early transition period, the hardening of budget constraints put all firms, including state-owned, under pressure to improve productivity and quality of output.

(EBRD, 1995). Under non-equity based linkages Western partner firms provide intermediate inputs and equipment to ex-CPE partners, as well as a variety of services ranging from design, to production and management techniques, to distribution/marketing. Once the impact of FDI is controlled for, the magnitude and growth rate of intra-industry trade and vertical specialization is a measure of the extent of managerial efforts to pursue restructuring efforts. The associated increase in integration can be regarded as an indirect measure of the success of the policy stance of individual countries.

The paper is organized as follows. Section 2 describes the changes in the pattern and composition of trade of European former CPEs. Section 3 investigates the extent to which shifts in exports to non-CMEA markets involves the same or very similar products that traditionally were traded within the CMEA, and the relative importance of arbitrage-driven re-export of goods produced in other ex-CMEA nations, especially Russia. Section 4 analyzes the role of intra-industry trade in the export performance of the CEECs, and the importance of integration/cooperation with EU suppliers and distributors in penetrating European markets. Section 5 returns to the issue of how much change in the structure of exports has occurred once intra-industry trade growth is controlled for. The role of FDI is discussed in Section 6. Section 7 concludes.

## 2. Changes in the Volume and Pattern of Trade[2]

Total per capita exports of a number of ex-CPEs are reported in Figure 1. Two points stand out.[3] First, the value of total trade in 1994 is roughly the same as in 1988. Second, the geographic pattern of trade changes significantly, the share of Western Europe increasing dramatically. It is, of course, not the case that there has been a simple redirection of trade, with aggregate volumes

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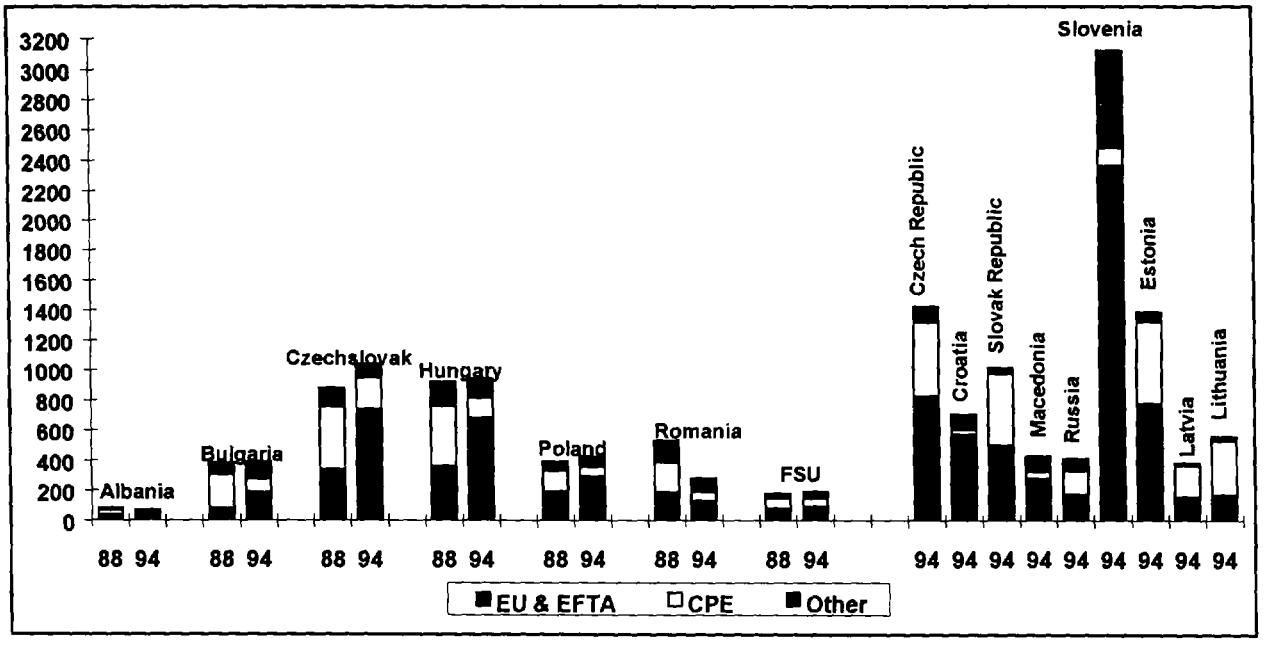
2/ See Kaminski et al. (1996) for a more comprehensive discussion of the determinants of the magnitude of re-orientation of trade flows of transition economies.

3/ Data for Baltic countries are only available starting in 1992, while trade statistics for countries such as Croatia, Macedonia and Slovenia commence in 1993. Time series comparisons of trade flows are therefore restricted to the CEECs. There are some measurement problems with respect to absolute value of exports in 1988. The trade data used in Figure 1 are drawn from the IMF Direction of Trade database, and have been adjusted for the overvaluation that results if official 'exchange rates' for convertible rubles are used. Total population data were used in the denominator. Aggregate data for the Czech and Slovak Republics are used in most of what follows in order to maintain comparability across time. Separate trade data for the Czech Republic and Slovakia are available starting in 1993. The Czech Republic accounts for some 80 percent of total exports of former Czechoslovakia. Throughout, reported imports by partner countries are used to measure exports of former CPEs. Because reported imports include freight and insurance this imparts a small upward bias to the level of imputed exports.

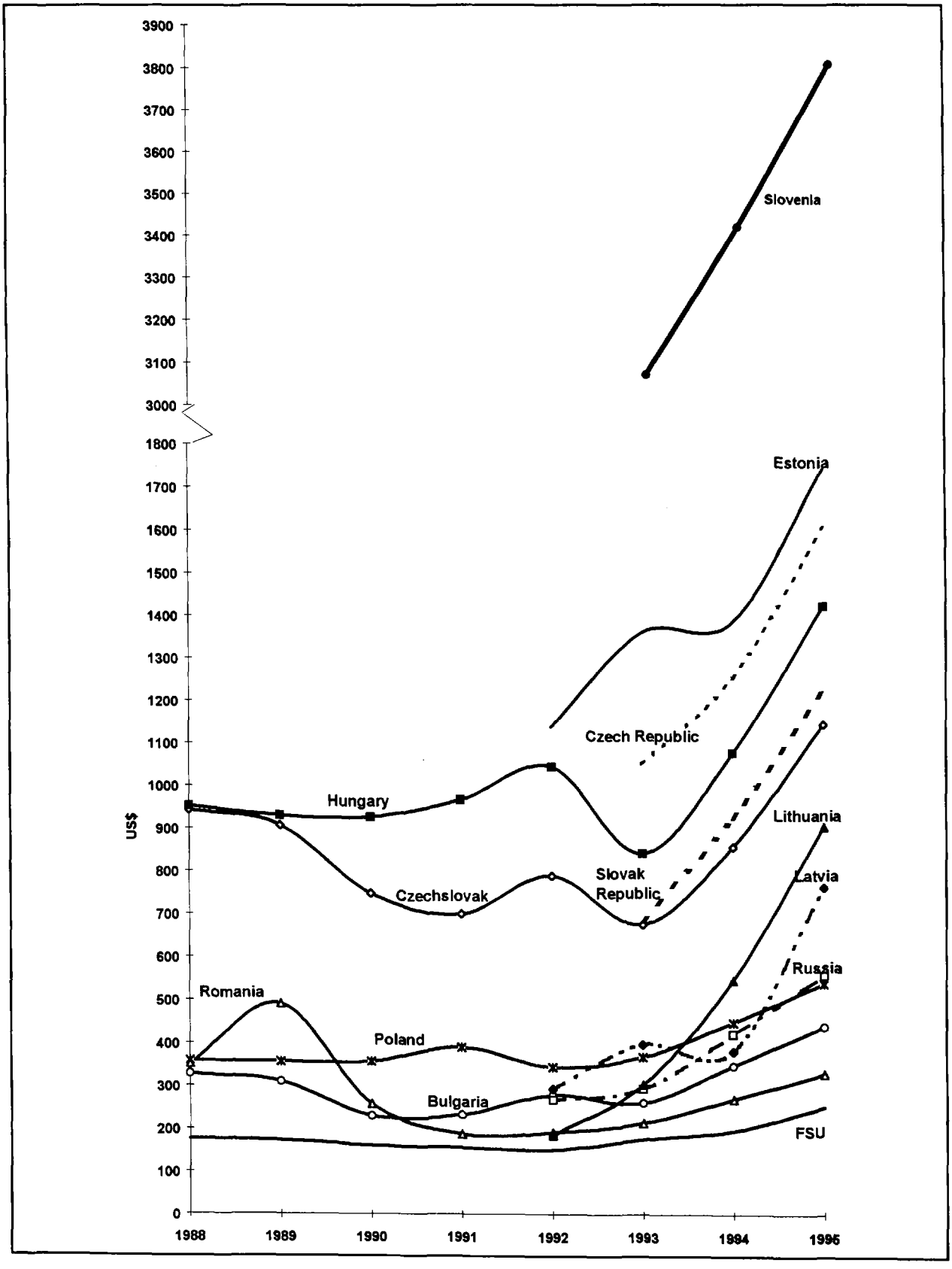
**Figure 1:** Per capita exports, 1988 and 1994 (US$)




remaining constant. After 1990 a steep decline in trade flows occurred for many CEECs, following the demise of central planning and the CMEA trading system. However, by 1994, with the exception of Romania, the majority of the CEECs had recovered from this shock. This reflects a successful shift away from traditional CMEA markets and an increase in exports of goods to OECD markets. The relative importance of the decline in total trade varies substantially across countries. Bulgaria, the Czech and Slovak Republics, and Romania experience the largest declines, starting in 1989. Exports decreased later for Hungary and Poland (in 1991) and recovered faster. The absolute magnitude of the decline was quite limited for Poland (Figure 2). Of the CEECs and the countries of the FSU, the value of per capita exports to the world in 1994 is highest for Slovenia (standing at $3,125), followed by the Czech Republic ($1,424), Estonia ($1,387), the Slovak Republic ($1,014) and Hungary ($943). At $192, that of the FSU is significantly lower.[4] Poland, Romania, Latvia and Russia have per capita exports in the $300-400 range. The Czech and Slovak Republics experience the highest growth rate in per capita exports, moving from a combined total of $878 to $1036, an

4/ The level of per capita exports is in part a function of country size: large nations tend to trade a smaller share of their GDP than small ones.

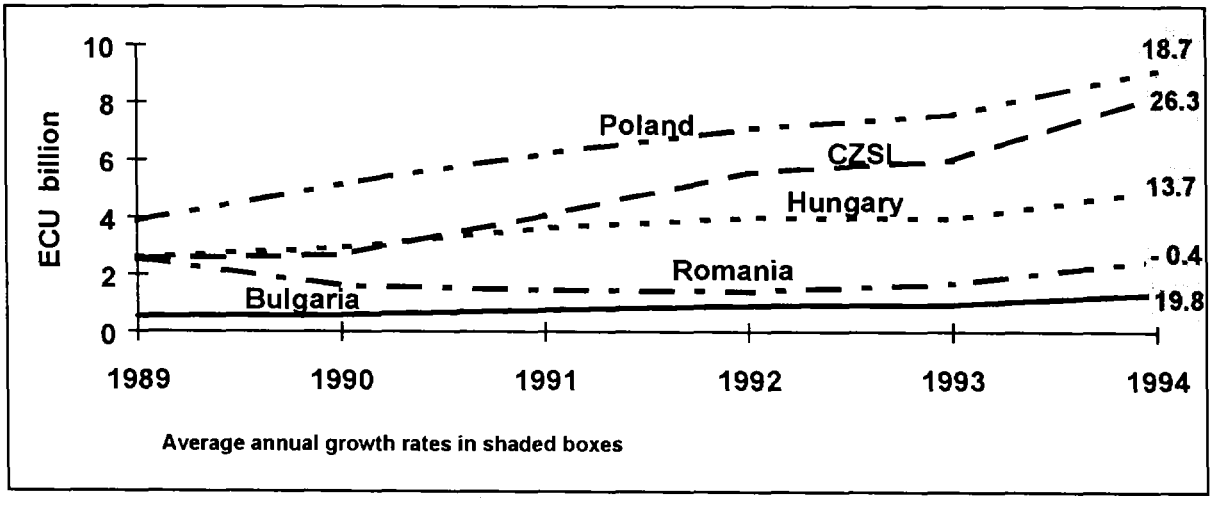
**Figure 2:** Per capita exports, 1988-94



increase of 18 percent.[5]

In 1988, most CMEA countries traded extensively with each other. However, in many cases trade with Western European countries accounted for over one-third of total exports (Table 1). Of the CEECs, Bulgaria was the most dependent on CMEA markets, almost 60 percent of total exports going to CPEs.[6] Czechoslovakia came second in terms of dependence on CPEs, followed by Hungary. Both countries still shipped about 40 percent of total exports to Europe--in contrast to Bulgaria, where the figure was only 20 percent. Between 1988 and 1994 the share of total exports going to Western Europe increased significantly for all CEECs. As of 1994, some 70 percent of all exports of the Visegrad countries--the Czech Republic, Hungary, Poland, and the Slovak Republic--went to Western Europe. The European share for Bulgaria, Romania, and the FSU as a whole was about 50 percent. In 1994, just 15 to 20 percent of total CEEC exports went to CPEs (including intra-CEEC trade flows, but excluding intra-Czech-Slovak trade). For some countries that were highly integrated into the CMEA the share of exports going to ex-CPEs has increased since 1992 (e.g., Bulgaria, Hungary, Estonia and Lithuania). The growth rate of exports to the EU is the highest for the Czech and Slovak Republics, followed by Bulgaria and Poland (Figure 3). Total exports to the EU rose by 16.6 per cent per year on average between 1989 and 1994 (from ECU 12 billion in 1989

**Figure 3:** Exports to EU, 1989-1994




5/ For purposes of comparison, countries such as Spain, South Korea, Portugal and Malaysia reached per capita export levels in the $1,500 range in 1990.

6/ CPEs in this paper are defined as the FSU and the CEECs. German Democratic Republic trade has been added to those of the Federal Republic in order to maintain comparability of data over time.

to 26 billion in 1994). In this period, total EU imports rose by only 3.8 per cent per year. The CEEC share in total EU imports rose from 2.7 per cent in 1989 to 4.7 per cent in 1994.

**Table 1: Share of Exports to Former Centrally Planned Economies and Western Europe, 1988-94***

| Country | CPE | | | Western Europe | | |
|---|---|---|---|---|---|---|
| | 1988 | 1992 | 1994 | 1988 | 1992 | 1994 |
| Bulgaria | 58.0 | 9.6 | 22.8 | 21.8 | 45.6 | 47.2 |
| Czechoslovakia[1] | 47.7 | 19.7 | 20.4 | 38.4 | 61.8 | 71.5 |
| Hungary | 43.6 | 7.7 | 14.4 | 39.1 | 75.1 | 72.1 |
| Poland | 35.7 | 15.7 | 14.9 | 49.2 | 62.3 | 69.3 |
| Romania | 37.7 | 25.3 | 21.4 | 35.1 | 37.8 | 47.3 |
| USSR[2] | 35.6 | 23.8 | 27.9 | 46.6 | 54.5 | 49.1 |
| Estonia | | 29.2 | 39.0 | | 68.5 | 56.1 |
| Latvia | | 58.0 | 54.1 | | 38.5 | 41.5 |
| Lithuania | | 57.8 | 64.1 | | 39.1 | 30.4 |
| Russia | | 35.4 | 37.2 | | 45.6 | 43.2 |

1 Excludes intra Czech-Slovak trade. Shares for the Czech Republic and the Slovak Republic of total trade with CPE were 18.5 and 8.5 percent in 1994.

2 1992-94 excludes intra-FSU trade to maintain comparability.

* CPE is defined as FSU (including Baltics), Bulgaria, Czech Republic, Slovak Republic, Hungary, Poland and Romania. The German Democratic Republic is excluded; its trade has been added to that of the Federal Republic of Germany (i.e., is included in Western Europe).

**Source**: IMF Direction of Trade Statistics.

Two measures of the contribution of "pure" redirection to export growth to OECD countries suggest that the reorientation of CEEC exports mostly comprises goods that did not figure importantly in CMEA trade. The first consists of a direct comparison of export volumes using the following procedure. For all product categories where total exports in 1994 are below 1988 levels, if 1994 exports to non-CPE markets are above 1988 levels, diversion is defined to equal to the difference between the two values. For product categories where total 1994 exports are greater than 1988 exports, the amount of "diverted" exports equals the change in the share of exports going to CPE countries between 1989 and 1994, times the value of 1988 exports. In both cases, if the absolute value of exports to non-CPEs of an item is lower in 1994 than in 1988, diversion is set at zero. On the basis of this measure no more that 20 percent of total exports to non-CPE markets comprises

"diversion," with Hungary having the highest number (20 percent), and Bulgaria the lowest (12 percent) (Table 2).

**Table 2: Reorientation of Exports, 1988-1994**

| Country | "Diversion" as share of total exports (%)* | Index of similarity** | |
|---|---|---|---|
| | | 1988 | 1994 |
| Bulgaria | 12 | -0.12 | -0.47 |
| Czechoslovakia | 17 | -0.16 | -0.55 |
| Poland | 15 | -0.34 | -0.68 |
| Hungary | 20 | -0.26 | -0.63 |
| Romania | 16 | -0.28 | -0.43 |
| FSU | 13 | 0.03 | -0.18 |

* For definition see text. Calculated at the 2-digit level of the Standard International Trade Classification (SITC).

** The index is defined as $\frac{1}{n} \Sigma (S_i^{CPE} - S_i^{ROW})$, where n is the number of 2-digit SITC categories (63), and $S_i$ is the share of exports of a category i to centrally planned economies and the rest of the world, respectively. The index ranges from -1 to +1. The closer to -1 (+1) the greater the dependence on ROW (CPE) markets.

**Source**: UN Comtrade database.

A second measure of redirection is a variant of the index of similarity, which suggests that all the CEECs were already oriented towards Western markets in 1988 (Table 2). In terms of diversification across markets, exports in a majority of 2-digit SITC items tended to go predominantly to non-CPE markets.[7] By 1994 this tendency had grown much stronger. Of the CEECs, Poland has the lowest share of exports going to former CPEs in both years, Romania and Bulgaria the highest. The FSU as a whole turns out to be balanced in 1988--about the same proportion of products went to CPE and non-CPE markets. By 1994, its trade had begun to be oriented towards non-CPE markets, but the extent of the dependence on such markets remained far below that of the CEECs. This measure also suggests that the relative importance of simple re-direction in export growth to non-CPE markets was limited.

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7/ As the focus is on the share of each tariff category shipped to different markets, no account is taken of the value of exports of each category. As noted earlier, in volume terms CMEA countries were the major market before 1988.

An analogous issue for the Baltic states is to what extent exports reflect arbitrage activities--the trans-shipment of goods originating in FSU countries. In addition to "pure" arbitrage, exports may also comprise processed commodities that are largely based on inputs obtained from the FSU. Given the close linkages between the Baltic countries and the rest of the FSU, such dependence is likely to have been high in the early transition period. Accurate estimates of arbitrage activity are difficult to obtain as detailed production and bilateral trade data are unreliable or not available. One approach to this issue is to look for natural resource exports by Baltic states that are not found in these countries. Nonferrous metals are an example. Another approach is to use data on traditional imports from Russia and relate these to exports by the Baltic states. To the extent that Baltic states are exporting commodities that in the past were imported from the FSU, this may reflect arbitrage. In general, given that the degree of price distortions in Russia making arbitrage profitable decline over the 1992-94 period, and recognizing that government control of exports of subsidized goods gradually increased, arbitrage is expected to decline over time.

Using these criteria, a number of 2-digit SITC items were identified where exports may to a greater or lesser extent consist of trans-shipment. These include non-metallic minerals and metals, crude fertilizers and metalliferous ores and scrap (headings 27-28), petroleum and products (heading 33), non-metallic mineral products (heading 66, which includes diamonds and precious stones), non-ferrous metals (68), transport equipment (78-79), and gold (97).[8] All of these commodities together accounted for a large share of total Baltic exports to the EU and EFTA in 1992, ranging from 45 percent for Estonia to 70 percent for Latvia (Table 3). By 1994, the share of these commodities in total exports had fallen for all three countries, dropping to 22 percent for Estonia, 58 percent for Latvia and 47 percent for Lithuania. To a large extent this does not reflect a decline in the absolute value of such exports. Much of the exports in the case of Latvia and Lithuania consists of oil and oil products, imports of which by 1994 were largely priced at world market levels.

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8/ Iron and steel and metal products (headings 67 and 69) do not figure importantly in exports of the Baltics.

**Table 3: Arbitrage and Baltic Exports to the EU and EFTA**

| | Estonia | | Latvia | | Lithuania | |
|---|---|---|---|---|---|---|
| | 1992 | 994 | 1992 | 1994 | 1992 | 1994 |
| Share of possible arbitrage goods in exports | 44.9 | 21.7 | 70.5 | 57.8 | 68.5 | 47.3 |
| Share of arbitrage goods excluding oil | 39.2 | 16.6 | 14.8 | 7.2 | 28.7 | 15.1 |
| Value of non-oil arbitrage exports (US$ million) | 139 | 129 | 77 | 93 | 178 | 162 |
| Value of arbitrage goods (US$ million) | 159 | 168 | 367 | 748 | 425 | 506 |

**Source**: UN Comtrade database.

### 3. Changes in Export Structure

The foregoing suggests that simple re-direction of trade played a limited role in export growth to Western Europe. Thus, trade with OECD nations consists largely of "new" goods or "traditional" goods that were upgraded/transformed sufficiently to satisfy export market requirements. Such changes in the product composition of trade reflect restructuring and economic adjustment. Changes in the product composition of trade will be reflected in trade statistics in various ways. One is in an increase in product differentiation. Under central planning the extent of product differentiation was limited, both to facilitate the planning process, and because the absence of competition did not provide an incentive for producers to differentiate goods. An indicator of increasing product differentiation is the number of tariff lines exported to OECD markets. The number of 6 digit tariff items where exports to the EU emerged during the 1989-94 period is significant in all CEECs, ranging from a low of 15 percent for Hungary to a high of 29 percent for the Czech and Slovak Republics (Table 4).[9] In terms of the contribution of such "new" items to total exports, Bulgaria stands out. Some 25 percent of 1994 exports comprises nontraditional products.

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9/ Such detailed data is not available from UN sources. However, the EU should be representative in this regard. New exports were defined as 6-digit categories of the EU's Combined Nomenclature (CN) where exports to the EU were ECU 50,000 or less in 1989, and exceeded ECU 100,000 in 1994. There are 5,010 product categories at the 6-digit level. Although 8-digit level data are available, changes in classifications at this level during the early 1990s may affect comparisons across time. Hoekman and Pohl (1995) use 8-digit data.

**Table 4: "New" Commodities in CEEC Exports to the EU, 1994**

| Country | Number of 6-digit items | Share in total items exported | Share in total value of exports |
|---|---|---|---|
| Bulgaria | 370 | 17.3 | 25.6 |
| Czechoslovakia | 1106 | 28.7 | 16.2 |
| Hungary | 493 | 15.1 | 13.0 |
| Poland | 716 | 19.7 | 7.1 |
| Romania | 353 | 16.5 | 9.5 |
| CEECs | 794 | 17.7 | 3.3 |
| FSU | 858 | 26.2 | 7.3 |

**Source**: EUROSTAT, COMEXT database.

In general, a shift occurs away from the production of machinery and equipment towards labor-intensive goods. For the CEECs as a whole, the share of clothing, footwear, travel goods and furniture (SITC items 82-85) in total exports to the EU and EFTA increased from 11 percent in 1989 to 20 percent in 1994. The Czech Republic is the least dependent on these goods (11 percent of total exports in 1994), Romania the most (47 percent). For Bulgaria, Hungary and Poland the share of these goods in total exports is about 20 percent, up from 6-8 percent in 1989. The same phenomenon occurs in the Baltic countries, especially Estonia and Lithuania. These products account for 21 percent of Estonian exports to the EU, 7 percent for Latvia, and 14 percent for Lithuania, as compared to some 4 percent for all three countries in 1992.

The change in relative specialization of CEECs over the 1988-94 period is perhaps the most straightforward measure of change in the composition of exports. Relative specialization is often measured as a country's revealed comparative advantage (RCA) in a given year.[10] Two indicators of the change in the composition of exports were constructed using RCAs. The first is the relative importance of exports of items where a "sign change" occurred--the RCA for an item that was greater (less) than one in 1988, had become less than (greater) than one in 1994; the second is the rank order

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10/ This measure is due to Balassa and is defined as: $\frac{x_{ij}/X_j}{\sum_{j=1}^{N} x_i / \sum_{j=1}^{N} X}$ where $x_{ij}$ are exports of commodity $i$ by country $j$, $X_j$ are country $j$'s total exports, and $N$ is the number of countries. In this paper RCA calculations are at the 2-digit or 4-digit SITC level (63 or 797 categories). A country is relatively specialized in goods where the RCA $> 1$.

correlation between RCAs for items in 1988 and 1994. The higher this correlation, the less change occurs.[11]

Bulgaria appears to have experienced much more change than any of the other CEECs if the first measure is used (Table 5). Items in which it was relatively specialized in 1988 (RCA > 1) but where exports fell enough for the RCA in 1994 to become less than one accounted for 6 percent of total exports in 1994, down from 33 percent in 1988 (Table 5). Conversely, items in which it became relatively specialized over the 1988-94 period accounted for only 26 percent of total trade in 1994, up from 5 percent in 1988. Noteworthy is the virtual absence of new export items in which the Czech and Slovak Republics became specialized. Much of the change in RCAs occurs in items in which they were already specialized. Often a shift occurred away from the products concerned, as reflected in a fall of the RCA to less than one in 1994 and large declines in exports. Items in which the Czech and Slovak Republics had been relatively specialized, but for which RCAs had fallen below one in 1994 accounted for just 19 percent of exports in 1994, down from 51 percent in 1988. For all the CEECs except Romania, significant movement occurs away from traditional specialization patterns. The FSU differs from the CEECs in that it neither "gains" nor "loses" comparative advantage in many items.

**Table 5: Changes in Specialization, 1988-1994**

| Country | Items where $RCA_{88} < 1$ and $RCA_{94} > 1$ (2-digit SITC) | | Items where $RCA_{88} > 1$ and $RCA_{94} < 1$ (2-digit SITC) | |
|---|---|---|---|---|
| | Share in 1988 exports | Share in 1994 exports | Share in 1988 exports | Share in 1994 exports |
| Bulgaria | 5 | 26 | 33 | 6 |
| Czechoslovakia | 0 | 0 | 51 | 19 |
| Hungary | 5 | 6 | 24 | 13 |
| Poland | 4 | 11 | 26 | 13 |
| Romania | 2 | 18 | 26 | 27 |
| FSU | 0 | 1 | 2 | 1 |

**Source**: UN Comtrade database.

11/ The first measure is perhaps the most "pure," given that RCAs are binary, not ordinal or cardinal variables. That is, a RCA of 5 for one good does not necessarily imply the country has a greater comparative advantage in it than for a good whose RCA is 2. All the RCA does is give information on whether a country is or is not relatively specialized in a product (see Yeats, 1985).

Another measure of change in export composition is the correlation between RCAs for items in 1988 and 1994. At the 2-digit SITC level this correlation is the highest for Poland, Hungary and Romania, and the lowest for Czechoslovakia (Table 6), suggesting the latter experienced large changes in the composition of exports. Comparator countries such as Morocco, Turkey, Spain, Mexico and Indonesia tend to have correlation coefficients in the 0.7-0.8 range, equivalent to Poland, Hungary and Romania. There are large differences in correlation coefficients between RCAs depending on whether they are calculated relative to global trade or relative to all imports into the EU market. In terms of exports to the EU Bulgaria has by far the lowest correlation, indicating the greatest change in the composition of exports to the EU. Hungary again has the least change.

**Figure 4:** Re-orientation of exports and change in specialization

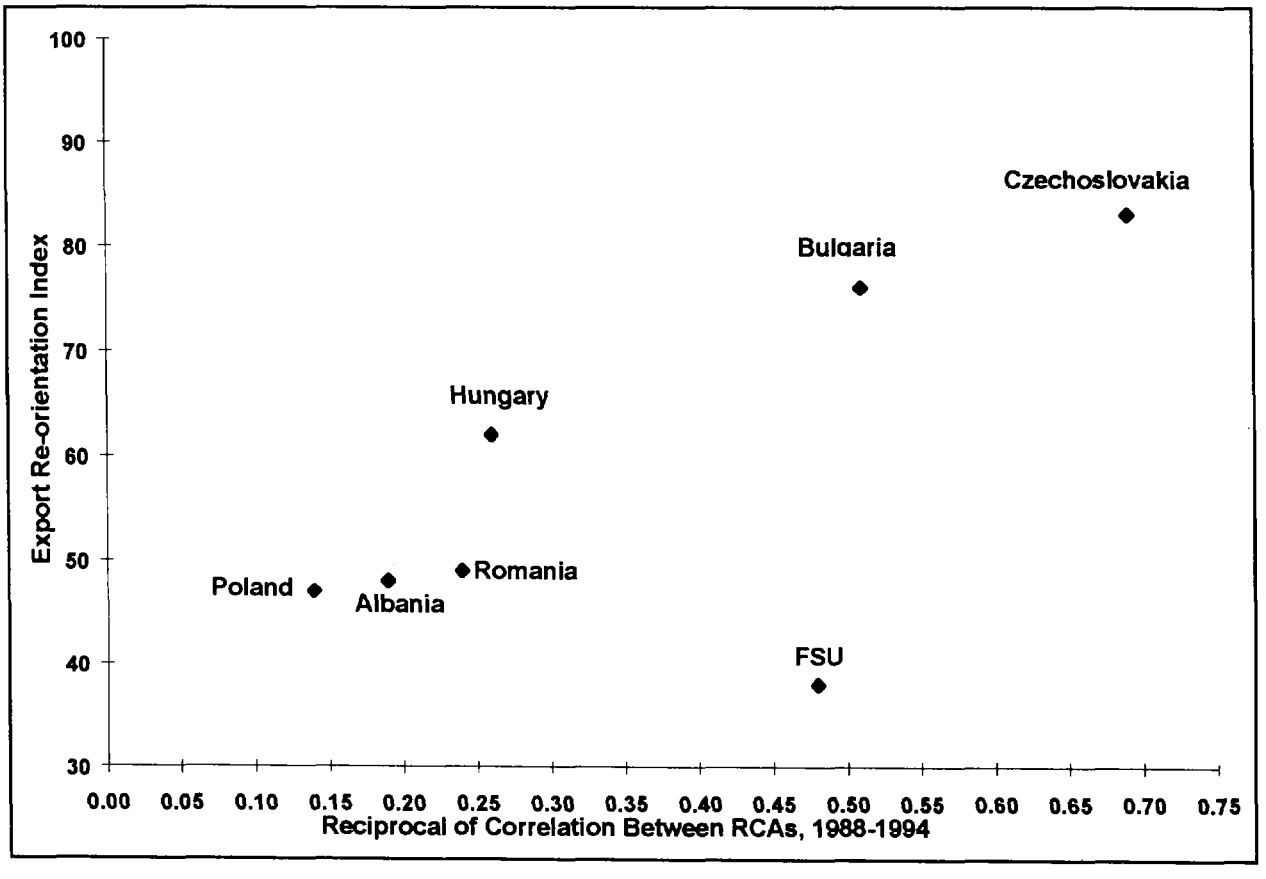

**Table 6: Correlation Between RCAs** (2-digit)

| Eastern European Countries 1988 - 1994 | | Comparators 1980 - 1988 | |
|---|---|---|---|
| RCAs vis-a-vis World | | | |
| Albania | 0.81 | Morocco | 0.84 |
| Bulgaria | 0.49 | Turkey | 0.74 |
| Czech and Slovak | 0.31 | Spain | 0.83 |
| Hungary | 0.74 | Mexico | 0.73 |
| Poland | 0.86 | Indonesia | 0.69 |
| Romania | 0.76 | Chile | 0.96 |
| | | Egypt | 0.93 |
| FSU | 0.52 | | |
| RCAs in the EU market | | | |
| Bulgaria | 0.13 | Morocco | 0.86 |
| Czech and Slovak | 0.53 | Turkey | 0.74 |
| Hungary | 0.74 | Spain | 0.83 |
| Poland | 0.47 | Mexico | n.a |
| Romania | 0.56 | Indonesia | n.a. |
| | | Chile | n.a. |
| FSU | 0.77 | Egypt | n.a. |

**Note**: RCAs in the EU market are defined relative to total EU imports rather than world trade.

**Source**: UN Comtrade and EU Comext databases.

The discussion on the re-orientation of trade and changes in the composition of exports is summarized in Figure 4.[12] This plots the magnitude of the change in exports going to OECD instead of former CPE markets against the correlation between 2-digit RCAs for product categories in 1988 and 1994. There appears to be an unambiguous relationship between the two variables. The greater the change in the composition of exports (relative specialization), the greater the extent of re-orientation across markets that occurs. Because the RCA correlations in Figure 4 are at the 2-digit SITC level, large increases in exports of a particular category may be driven by large increases in imports of goods in the same category (i.e., intra-industry trade). The extent to which changes in export composition reflect changes in imported input flows rather than reorientation of final production activities is investigated below.

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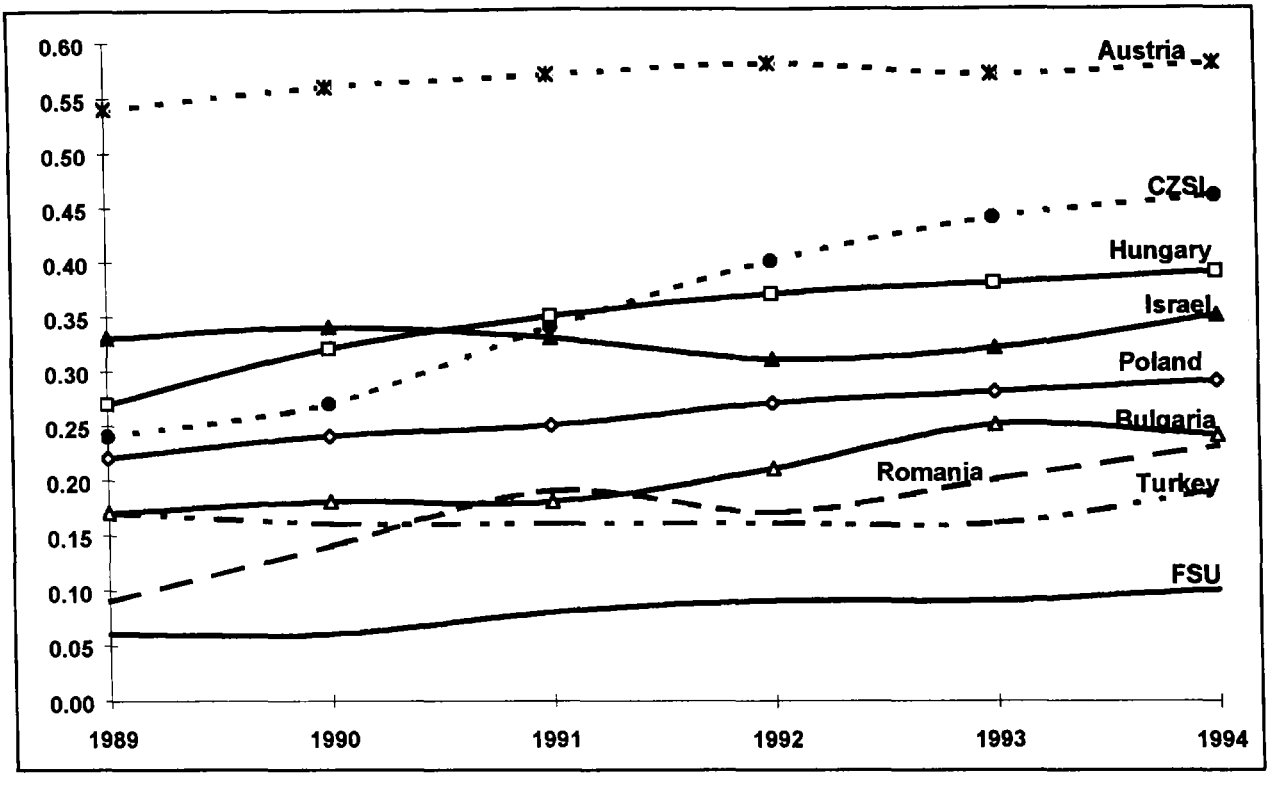
12/ Reorientation in Figure 4 is defined as $[|X_{88,CPE} - X_{94,CPE}| + |X_{88,ROW} - X_{94,ROW}|]/X_{88}$, where X is exports in 1988 or 1994 to the former CPEs or the rest of the world (ROW).

**Figure 5:** Intra-industry trade with the EU, 1989-1994




## 4. Intra-Industry Trade

Intra-industry trade has expanded substantially since 1989 for all the CEECs. The Czech Republic stands out in this regard.[13] Using 4-digit SITC data, the Czech and Slovak intra-industry trade index stood at 0.47 in 1994, up from 0.24 in 1989.[14] Levels of intra-industry trade are also high for Slovenia (0.41) and Hungary (0.39). While still below the levels registered for advanced

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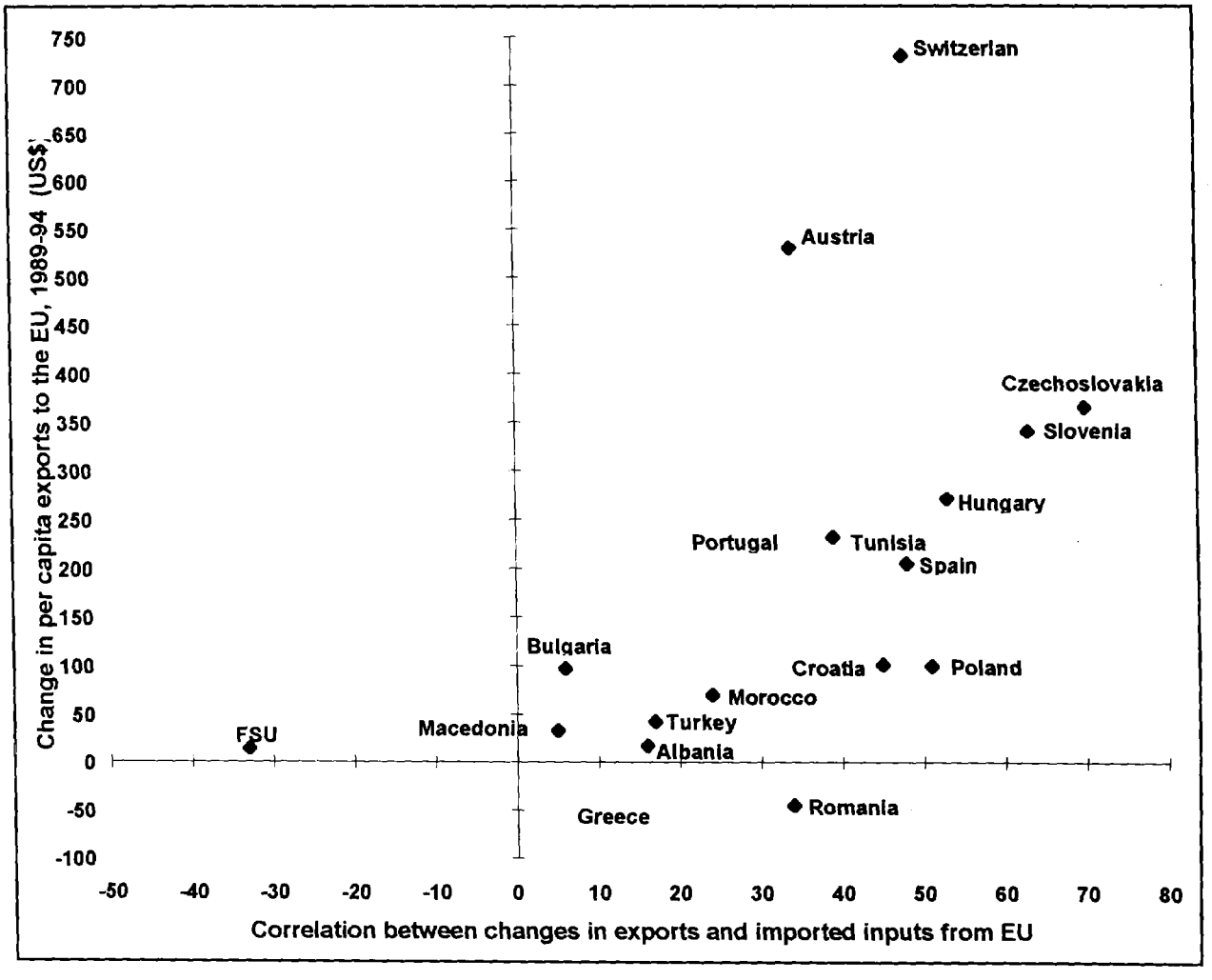
13/The index of intra-industry trade used is the Grubel-Lloyd measure, defined as: $1 - \frac{\sum_i |X_i - M_i|}{\sum_i (X_i + M_i)}$ where $X_i$ and $M_i$ are a country's exports to--and imports from--a trading partner of commodity $i$, respectively.

14/ Most of this is accounted for by the Czech Republic. 1994 data give an intra-industry trade index with the EU of 0.47, as compared to 0.32 for the Slovak Republic. There are 797 product categories at the 4-digit level. The value of intra-industry trade indices depends in part on the level of aggregation of the data used. The less aggregated, the higher the index. At the 2-digit level, for example, the index is 0.6 for the Czech Republic. However, at this level of aggregation less of the trade flows will involve similar products.

industrial countries in the region (4-digit level indices for Austria and Switzerland were 0.58 in 1993), intra-industry trade levels have been growing rapidly (Figure 5). Slovenia, the Czech Republic and Hungary currently have indices that exceed those of Portugal and Greece (where intra-industry trade indices for intra-EU exchange were 0.34 and 0.18, respectively, in 1993). The rapid

**Figure 6:** Growth in per capita exports and imports of inputs from EU, 1988-94




growth in intra-industry trade again suggests substantial change--indices for comparator countries over 5 to 10 year periods are much more stable, increasing slowly, if at all.

There are various dimensions that may underlie such intra-industry exchange. The first is the textbook explanation, where it is the result of firms specializing in differentiated products, driven by the need to realize economies of scale or scope. A second factor was mentioned in the Introduction: in the early stages of the transition to a market economy CEEC firms are likely to have incentives to

establish linkages with West European counterparts, thereby obtaining access to know-how, working capital, and distribution channels. Intra-industry trade is a mechanism through which transfers of technology occur. As discussed earlier, transitional incentives lead one to expect that vertical intra-industry trade will be more important than horizontal exchanges.

Information on input use across industries drawn from an input-output table can be used to calculate the extent to which the intra-industry trade consists of imports of intermediate inputs and capital goods from the EU that are used in processing activities and (re-)export. Rank order correlation coefficients between the change in exports to the EU during 1988-94 and the change in imports of inputs from the EU on an industry by industry basis reveal large differences across CEECs. Bulgarian exports to the EU appear to be largely unrelated to imports from the EU, while the dependence of Czech and Slovak Republic exports on imports from the EU is quite high (Figure 6). The data plotted in Figure 6 suggests there is a strong relationship between changes in per capita exports to the EU and dependence on intermediates sourced from the EU used in the production of the exported goods, one that is not idiosyncratic to the CEECs.[15] The intensity of use of EU inputs by the Czech and Slovak Republics, Slovenia, Hungary and Poland exceeds that of countries such as Switzerland, Austria, Spain and Portugal. For high-income countries such as Switzerland or Austria this is due in part to similarities in average production costs, reducing the incentives to engage in vertical specialization. The fact that the CEECs' "EU-intensity" is also higher than for countries such as Portugal or Spain illustrates not only that the need to upgrade production quality and obtain embodied transfers of know-how and access to distribution was compelling, but that there may also be some "overshooting."

Although there are good economic reasons to expect high levels of CEEC-EU intra-industry trade, trade policy may provide an additional explanation for the observed increase. The EU grants more liberal entry conditions for goods that embody a significant amount of inputs that originated with EU firms. Under so-called outward processing customs regimes, duties on goods that are re-imported after processing are usually based on the value added abroad, not on the gross value of the goods. In the case of the CEECs, the Europe Agreements eliminated tariffs on such trade altogether

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15/ As detailed input output tables for all of the CEECs were not available, the 1992 table for Poland was employed to calculate the use by each of 32 industries of inputs from all other industries. Data on import dependence for non-CEEC comparator countries reported in Figure 6 are based on national 1990-91 input-output tables for each of these countries, obtained from the Michigan Model of Global Production and Trade. Each of the latter input-output tables contains 29 sectors.

for goods that satisfy the agreement's rules of origin (Naujoks and Schmidt, 1994).[16] Often a local content requirement applies, i.e., a specified proportion of the value of the good must have been added in either the EU or the CEEC concerned. Outward processing incentives and rules of origin are likely to stimulate sourcing of intermediates and components from the EU, and thus intra-industry trade. It is unfortunately not possible to determine the impact of the rules of origin in fostering intra-industry exchange from trade data alone. This is because the economic incentives mentioned earlier for CEEC firms to establish links with EU firms makes it difficult to distinguish between these two forces. The economic rationale for integration with the EU is likely to outweigh trade policy- based considerations. In large part this is because the EU's MFN tariffs are generally low enough to ensure that even if no preferential regimes existed the cost to CEEC exporters would be limited.

In 1994, goods entering the EU under outward processing customs regimes accounted for about 17 percent of total CEEC exports to the EU, up from 10 percent in 1989. Similarly, imports from the EU for inward processing grew from 7 to 12 percent of the total. Processing activities generated 28 percent of Romania's exports to the EU in 1994, up from 13 percent in 1989. Outward processing trade (OPT) for the other CEECs accounts for 10-18 percent of total exports. In Baltic countries OPT is most important for Lithuania, accounting for 10.5 percent of total of exports to the EU in 1994, compared to only 2 percent in 1992. In Estonia and Latvia they account for 4.5 percent of exports to the EU, starting from a lower base of some 0.5 percent in 1992.

Most of the processing occurs in leather/footwear (20-30 percent of total exports) and textiles/clothing (60-80 percent), both "sensitive" product categories. Other industries where it is significant include electrical machinery (10-16 percent), precision instruments (16-18 percent) and furniture (15-20 percent). Most of the latter activities are concentrated in the Czech and Slovak Republics, Hungary and Poland.[17] Although the total share of OPT in exports has increased significantly since 1988, its importance has declined for certain product groups. The most prominent in this connection is furniture. Hungary, Poland, and Romania had relatively high levels of processing trade in this area in 1989; by 1994 this had declined by 50 percent or more. This does not imply that exports of this product to the EU fell. To the contrary, they expanded very substantially.

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16/ For in-depth discussions of the Association Agreements, see Winters (1992) and Kaminski (1994).

17/ Processing trade has also expanded in agricultural goods. Almost 5 percent of Poland's agricultural exports to the EU enter under the outward processing regime. This is due in part to processing of raw crustaceans and other fish in Poland (Naujoks and Schmidt, 1994).

Instead, the incentive to use OPT as a way of contesting EU markets declined following the implementation of the Interim Agreements. It also does not mean that the use of EU inputs declined. The increase in intra-industry trade discussed earlier suggests the opposite.

The magnitude of--and rapid increase in--intra-industry trade is likely to have implications for adjustment costs and market access opportunities in the future. The relative importance of intra-industry trade is often regarded as an indicator of the extent to which significant adjustment pressures are likely to arise as a result of liberalization. Adjustment costs may be lower if intra-industry trade is high because the jobs lost due to customers shifting to more efficient foreign suppliers will be offset to a greater or lesser extent by the job-enhancing expansion in demand for imports from the foreign partner for similar goods. The political opposition to liberalizing and expanding intra-industry trade is generally expected to be more muted than in instances where trade flows are predominantly of the inter-industry type. In the latter case industries that are less competitive than those abroad will generally be forced to contract substantially.[18]

## 5. Intra-Industry Trade and Change in Export Structure Revisited

The high levels and growth rates of intra-industry trade for some of the CEECs suggest that the measures of change in export composition calculated earlier may be biased upward. That is, low correlations between 2-digit RCAs in 1988 and 1994 may simply reflect high growth in intra-industry trade. A measure of relative specialization that (implicitly) controls for intra-industry trade is $x_i/X - m_i/M$, where $x_i$ and $m_i$ are exports and imports of a specific commodity $i$ by a country, and $X$ and $M$ are the country's total exports and imports.[19] This measure ranges from -1 to +1. If it is positive, the country is relatively specialized in a good, and vice versa. The closer it is to zero, the more important intra-industry trade is likely to be. If correlations are calculated between the value of this indicator in 1988 and 1994 (again at the 2-digit SITC level), Czechoslovakia demonstrates the least change in export composition of all the CEECs (Table 7). Indeed, Bulgaria becomes the only CEEC

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18/ See Greenaway and Hine (1991) for a survey of the theory and evidence in the EU context. This is not to say that intra-industry trade will not lead to adjustment and thus pressure for protection. To the extent that there are specific and relatively immobile factors of production that are injured by import competition, they can be expected to seek protection. But the factors that are hurt will be at the firm-level. Other firms in the industry will expand. This makes it more difficult to obtain protection, as there will be conflicting interests within industries.

19/ This index has been used by Neven (1995).

demonstrating significant change in the structure of exports. As noted earlier, it also has one of the lowest levels of intra-industry trade, so this result should not be surprising.

**Table 7: Further Measures of Change in Export Structure**

| Country | Change in relative specialization $\rho(x/X\text{-}m/M)_{88,94}$ 2-digit SITC (n=69) | $\rho$(RCA)88,94 Exports to world, 4-digit SITC (n=797) | $\rho$(RCA)88,94 Exports to EU, 6-digit CN (n=5,010) |
|---|---|---|---|
| Bulgaria | 0.27 | 0.52 | 0.37 |
| Czechoslovakia | 0.73 | 0.88 | 0.41 |
| Hungary | 0.73 | 0.71 | 0.63 |
| Poland | 0.72 | 0.47 | 0.50 |
| Romania | 0.67 | 0.67 | 0.53 |
| FSU | 0.78 | 0.66 | 0.39 |

**Source:** UN COMTRADE.

Greater insight into the relative importance of intra-industry trade for the CEECs can be obtained from re-calculating the RCAs used in Section 3 at more disaggregated levels. If RCA correlations are calculated at the 4-digit SITC level (797 categories), the Czech and Slovak Republics again have the least change in the composition of exports (the highest correlation between RCAs) (Table 7). Czech and Slovak export growth is therefore concentrated in sectors that were exported in the late 1980s, and to a large extent the low correlation across 2-digit RCAs noted earlier is driven by the increase in intra-industry trade. Using 4-digit level RCA data, Bulgaria and Poland experience the greatest change in the composition of their exports. If attention is restricted to changes in exports to the EU a somewhat different picture emerges. The third column of Table 7 reports the correlation between RCAs in the EU market, calculated at the 6-digit level of the EU's Common Nomenclature. Noteworthy is that the export composition of the Czech and Slovak Republics changes more than that of the other Visegrad countries. In conjunction with the limited change in 4-digit RCAs for exports to the world, this suggests that although "redirection" of exports from CMEA to Western markets is significant, in the sense that much of the export growth is concentrated in "traditional" export items, this does not mean an absence of a supply response. It is clear from the 6-digit RCA data that a

substantial amount of product differentiation and vertical specialization has occurred. As noted earlier, at the 6-digit level many of the exports to the EU are "new." The 6-digit data on Bulgarian and Polish exports to the EU also imply significant change in the product mix, although less than for Czechoslovakia. Together with the relatively high degree of change implied by 4-digit SITC RCAs, this suggests less "redirection-cum-upgrading" of traditional exports and more change across sectors.

One consequence of high levels of intra-industry trade and a high reliance on OPT is likely to be relatively low value added. If so, this may be reflected in the unit values of exports. Trends in export unit values also embody information on the ability of firms to improve the quality of export production over time. Unit values of CEEC exports are lower than those of dynamic industrializing countries such as South Korea, but are not significantly below the average unit value of EU imports of many commodities. Average unit values increased for the majority of CEEC exports to the EU during 1989-94.[20] Although for some sectors/countries unit values decline--e.g., organic chemicals, plastics, iron and steel, copper products, motor vehicles--such declines are not very large (Table 8). Most sectors have either flat or increasing unit values. In growth terms ("quality upgrading"), the Czech and Slovak Republics and Hungary appear to have the best performance. Between 1988 and 1994 unit values of garments, footwear, copper articles, and electrical machinery increase significantly. To a large extent this constitutes a process of catching up with the world average, which in clothing and footwear had been more than achieved by 1994. The absolute levels of unit values for Czech and Slovak products are often significantly below those of Hungary, which has had the highest "quality" exports of all the CEECs throughout the period.[21] Hungary also had the greatest increase in unit values of exports of machinery and electrical equipment, although the unit value of such exports remains significantly below the EU's average import value. Israel, for example, has export unit values for electrical machinery that are almost four times the Hungarian level. While this is not surprising--these are sectors where the competition from both industrialized and industrializing countries is intense--it illustrates the quality gap that still needs to be overcome.

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20/ This contradicts the conclusions drawn by Drabek and Smith (1995).

21/ This may be a reflection of initial conditions. Hungary initiated reforms to central planning well in advance of the other CEECs.

## Table 8: Unit Value Comparisons for Major CEEC Exports to the EU, 1988 and 1994 (ECU/kg)

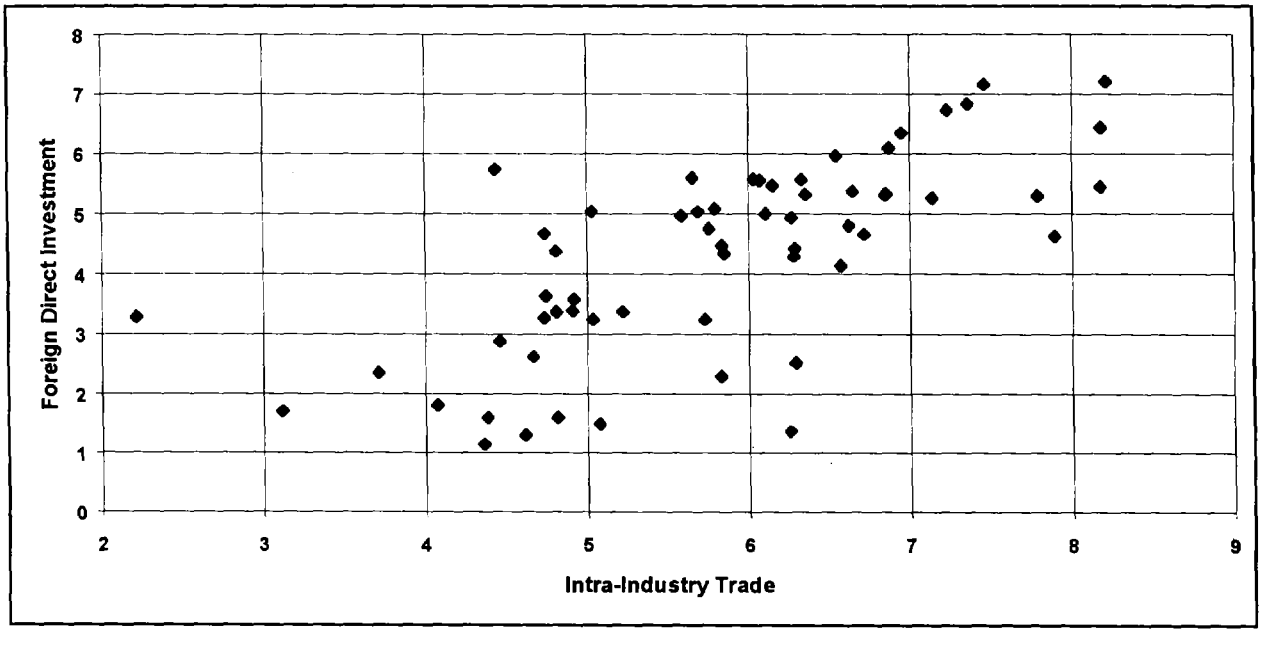
| CN Item | Description | Bulgaria | | Czechoslovak | | Hungary | | Poland | | Romania | | Israel | | Korea | | Total EU Imports | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 88 | 94 | 88 | 94 | 88 | 94 | 88 | 94 | 88 | 94 | 88 | 94 | 88 | 94 | 88 | 94 |
| 29 | Organic chemicals | 0.6 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 | 0.6 | 0.6 | 0.4 | 0.4 | 0.9 | 1.4 | 1.6 | 1.9 | 1.2 | 1.5 |
| 39 | Plastics and plastic products | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.7 | 0.6 | 1.0 | 0.8 | 0.5 | 1.9 | 1.6 | 1.9 | 1.5 | 1.9 | 1.7 |
| 44 | Wood and articles of wood; wood charcoal | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 1.3 | 1.5 | 1.3 | 2.6 | 0.3 | 0.4 |
| 61 | Articles of apparel and clothing accessories, knitted or crocheted | 9.1 | 9.8 | 11.1 | 19.2 | 17.6 | 19.9 | 11.4 | 15.5 | 11.0 | 11.4 | 26.4 | 30.1 | 14.8 | 16.2 | 15.6 | 14.6 |
| 62 | Articles of apparel and clothing accessories, not knitted or crocheted | 15.7 | 18.4 | 16.0 | 22.7 | 28.0 | 32.5 | 23.4 | 27.1 | 18.4 | 19.1 | 38.3 | 50.0 | 19.6 | 25.8 | 18.5 | 19.0 |
| 64 | Footwear, gaiters and the like; parts of such articles | 6.6 | 10.2 | 5.7 | 10.8 | 18.3 | 19.1 | 10.7 | 11.2 | 11.1 | 11.3 | 6.4 | 9.7 | 10.6 | 15.5 | 10.6 | 10.9 |
| 72 | Iron and steel | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.6 | 0.7 | 0.4 | 0.4 |
| 73 | Articles of iron or steel | 0.5 | 0.5 | 0.5 | 0.7 | 0.5 | 1.0 | 0.6 | 0.7 | 0.6 | 0.6 | 1.9 | 3.1 | 2.1 | 4.1 | 1.4 | 1.4 |
| 74 | Copper and articles thereof | 2.0 | 1.8 | 0.4 | 1.5 | 1.6 | 1.6 | 2.1 | 1.9 | 1.6 | 1.3 | 1.4 | 1.5 | 10.3 | 6.3 | 2.2 | 1.9 |
| 84 | Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof | 2.4 | 3.8 | 3.1 | 3.0 | 2.7 | 4.7 | 2.0 | 2.3 | 2.6 | 2.7 | 14.5 | 19.0 | 13.6 | 9.4 | 15.7 | 16.8 |
| 85 | Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles | 3.4 | 4.4 | 2.3 | 6.6 | 4.9 | 10.0 | 2.2 | 4.4 | 2.6 | 4.0 | 30.6 | 38.7 | 10.4 | 21.6 | 18.6 | 22.7 |
| 87 | Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof | 3.2 | 1.7 | 2.1 | 3.4 | 2.6 | 4.2 | 2.3 | 3.5 | 2.4 | 1.7 | 3.2 | 6.5 | 4.0 | 5.7 | 5.7 | 7.2 |
| 94 | Furniture; medical and surgical furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified; illuminated signs and name-plates | 1.3 | 1.5 | 1.4 | 1.5 | 1.6 | 2.7 | 1.2 | 1.6 | 1.3 | 1.4 | 2.9 | 2.8 | 5.7 | 3.4 | 2.3 | 2.6 |
| Memo: | Share of these items in total exports (%) | 43.3 | 57.0 | 54.1 | 62.2 | 48.1 | 64.9 | 45.8 | 62.2 | 49.2 | 74.5 | 17.9 | 36.7 | 67.2 | 74.7 | 40.6 | 46.4 |

**Source:** EU COMEXT.

## 6. Foreign Direct Investment and Export Performance

Intra-industry trade is often associated with FDI (Greenaway and Milner, 1987). To what extent is the growth in intra-industry trade in the CEECs driven by inward FDI from Western Europe as opposed to arms-length cooperation and exchange? It is well known that Visegrad countries attracted substantial investment in the automobile sector, and it is conventional wisdom that much of the export growth in this sector is associated with these investments. But the importance of FDI more generally has not been determined. The absolute level of inward FDI flows has not been very high, and there are significant differences across CEECs. Hungary attracted by far the most FDI during 1990-1994, Bulgaria the least. Total (cumulative) FDI in Hungary stood at $6.5 billion in 1994, as compared to $3.9 billion in the Czech Republic; $4.7 billion in Poland; $400 million in the Slovak Republic; and $552 and $262 million in Romania and Bulgaria. FDI flows have tended to be dominated by very large investment in particular sectors. Automobiles account for 18, 21, and 18 percent of the total in Poland, Hungary and the Czech and Slovak Republics, respectively. A $1.4 billion investment by Philips in Hungary in 1991 accounts for another 20 percent of the total. If investments in service sectors are also taken into account (e.g., hotels, telecommunications) the significance of FDI in tradables is quite limited (EBRD, 1995).

**Figure 7:** Log of FDI and Intra-industry trade volume in the CEECs



The relationship between the log level of FDI and the log level of the volume of intra-industry trade for 12 tradable industries is plotted in Figure 7 for the 5 CEECs (including the Czech and Slovak Republics as one entity). The plot suggests there is a strong correlation between the absolute amount of sectoral FDI and the level of intra-industry trade in 1994. This is confirmed by regression analysis. Economic theory predicts that the volume of intra-industry trade is a function of the similarity and the level of GDP of countries, and of distance (Helpman. 1987). Empirical analyses do not unambiguously support the theory (Hummels and Levinsohn, 1995), arguably because the theory is not well specified--many theories are consistent with the result that the more similar are two nation's GDP, the higher is the volume of trade (Deardorff, 1995). In attempting to determine the relative importance of FDI in explaining intra-industry trade, it is nonetheless helpful to control for these two factors, as they figure prominently in any theory of trade volumes. If the log of intra-industry trade in a sector is regressed on FDI, a standard size dispersion index, and the distance between each CEEC capital and Frankfurt, all parameters have the expected signs, but only FDI is a statistically significant explanatory variable (Table 9).[22]

**Table 9: FDI and the Volume of Intra-Industry Trade**, 1990-94

| Variable | **Parameter Estimate** (t-statistic in parentheses) |
|---|---|
| Intercept (a) | 6.3 (2.1) |
| FDI ($b_1$) | 0.40 (4.4) |
| Size dispersion ($b_2$) | 0.19 (0.7) |
| Distance ($b_3$) | -0.47 (-1.6) |

**Source:** FDI data from World Bank (1996) and EBRD (1995). Trade data from EU COMEXT, concorded by authors to FDI classification.

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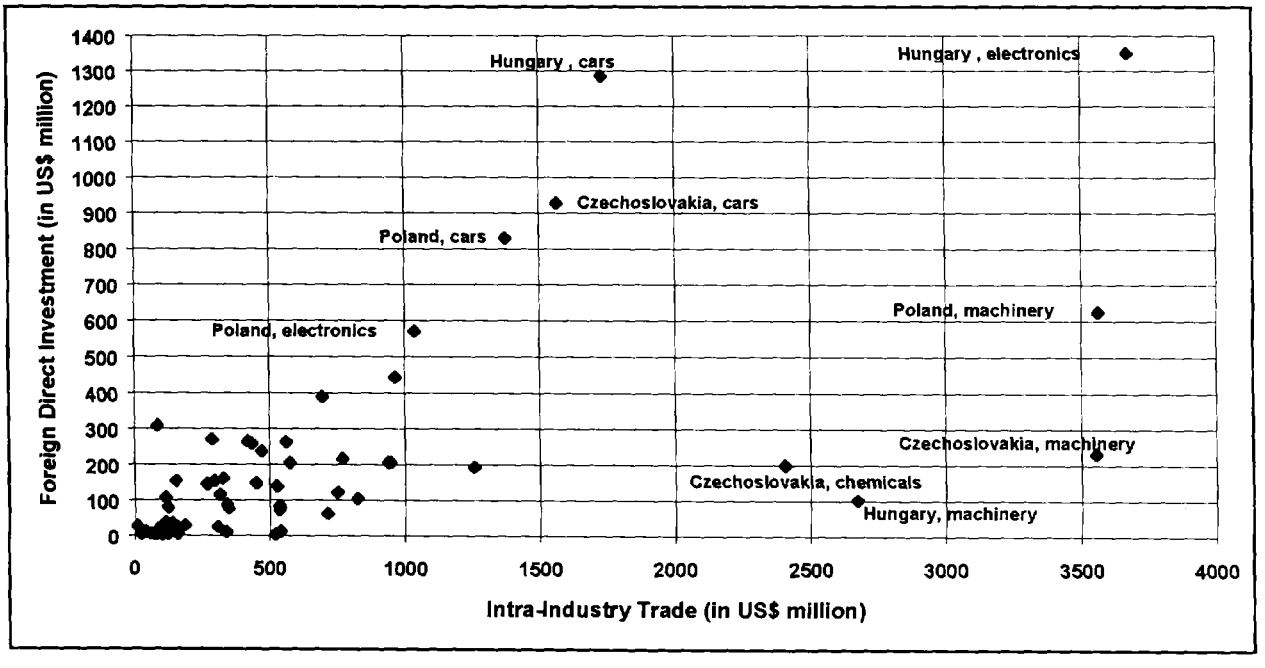
22/ The equation that was estimated was:

$$log\ IIT_{ij} = a_j + b_1\ log\ FDI_{ij} + b_2\ log\ [GDP_{jEU}(1-(s_j)^2-(s_{EU})^2)] + b_3\ log\ D_j + \epsilon_{ij},$$

where $FDI_{ij}$ is cumulative 1990-94 total inward FDI for CEEC $j$ (j=1-5) in sector $i$ (i=1-12); $GDP_{jEU}(1-(s_j)^2-(s_{EU})^2)$ is the Helpman (1987) country size dispersion index (where $GDP_{jEU}$ is the joint GDP of CEEC $j$ and the EU and $s$ is the share of each partner in joint GDP) and $D_j$ is the distance between each CEEC's capital and Frankfurt. The volume of intra-industry trade (IIT) is defined on the basis of the Grubel-Lloyd index as $IIT_{ij}=2min(X_{ijEU}, X_{iEUj})/(X_{ijEU}+X_{iEUj})$, where $X$ is exports of sector $i$ from the EU to CEEC $j$, or vice versa. The twelve tradable industries for which FDI data are available are automobiles, other transport equipment, beverages, construction materials, chemicals, electronic products, engineering and heavy machinery, food processing, furniture, textiles and clothing, footwear, and tobacco.

While these results are suggestive, they cannot be interpreted to imply that FDI is driving the growth in the volume of intra-industry trade. Causality cannot be inferred. The firm level data required to determine the contribution of foreign-owned or controlled firms to the volume of intra-industry trade is not available. However, a sense for the relative importance of FDI can be obtained by plotting absolute values of FDI against the value of the intra-industry trade index for each of the 12 sectors (Figure 8). It can be seen that the greatest amounts of FDI are concentrated in cars (Poland, Hungary and Czechoslovakia). The Philips investment in electric equipment (light bulbs) is another outlier, being associated with very high levels of intra-industry trade. Excluding these 4 observations, the relationship between FDI and intra-industry trade appears very weak. Noteworthy is the fact that in engineering and heavy machinery such trade is not associated with significant amounts of FDI. This suggests that exports are mostly "home grown" and that intra-industry trade is substantially arms-length in nature.

**Figure 8:** Value of FDI by sector and volume of Intra-industry trade




## 7. Conclusions

This paper has investigated the export performance of European former centrally-planned economies. A strong relationship was found to exist between the relative importance of intra-industry trade and export growth performance in EU markets. The Czech and Slovak Republics register the

highest growth in exports, the greatest re-orientation in the pattern of trade, and also stand out in terms of the number and importance of 'new' products in total exports. They also have the highest level and rate of growth in intra-industry trade with the EU. Although great changes occur in the commodity composition of exports measured at the 2-digit SITC level, this is mostly a reflection of the rise of intra-industry trade. Calculations of the change in RCAs at more disaggregated levels suggest that the Czech and Slovak Republics have undergone the least change in the overall composition of total exports. However, the relatively great change in the composition of exports to the EU *within* these sectors reveals that Czech and Slovak firms pursued a strategy of upgrading and differentiating "traditional" exports. The strong relationship between the increase in vertical intra-industry trade and export performance reveals an extensive reliance upon EU firms for new machinery, components, and know-how. This reliance on the EU for inputs is also high for Slovenia, Hungary and Poland. All these countries are currently more dependent on (or integrated with) the EU than countries such as Portugal, Spain, or Austria. As they also experience the highest growth rates in exports to the EU (on a per capita basis), this appears to be a characteristic of successful transition.

Simple re-direction of goods that were traditionally exported to CMEA markets does not appear to have played an important role in the growth in exports to Western Europe. At most 20 percent of the export volume comprises "diverted" CMEA goods. Instead, export growth is either in products that were not exported at all to the CMEA, or, comprise "traditional" export items that have been substantially upgraded or differentiated. Countries that follow the latter "strategy"--the Czech and Slovak Republics and Hungary--rely more heavily on intra-industry trade and vertical specialization. Bulgaria and Poland experience greater change in the broad composition of exports and have lower levels of intra-industry trade with the EU. Hungary differs from the Czech and Slovak Republics in a number of ways. It experiences less change in the composition of exports, has lower export growth rates, has higher unit values, and has attracted more FDI. To some extent the fact that Hungary initiated reforms much earlier than Czechoslovakia explains these differences.

FDI inflows are highly correlated with export performance and intra-industry trade levels. Existing data do not allow an investigation of the direction of causality or the relative contribution of foreign affiliates or joint ventures to the volume of trade. However, the volume of FDI flows was quite limited up to 1994. If large investments in the automobile sector are excluded, it appears that FDI is unlikely to have been a major force driving the growth of intra-industry trade. These

exchanges and the underlying integration into the world economy mostly reflect arms-length transactions between CEEC firms and Western European counterparts.

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